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evaluation of CAD. However, a few interesting points arise from the analysis, and several caveats have to be considered before reaching a final conclusion.

First, authors defined obstructive CAD as coronary stenosis >50% rather than 70%, which might account for higher reported sensitivity of CCTA in the study. It has been shown that ≥70% stenosis is a better predictor of associated physiologically significant perfusion defect and has more clinical implications (2). It would be interesting to know whether the investigators have data with regard to the degree of stenoses and perfusion defect, so that more appropriate conclusions can be made before accepting the study result that stress test did not predict obstructive CAD (1). Moreover, the reported low yield of stress testing in the study can be explained on the basis of work-up bias (inclusion of patients for disease verification by a gold standard test based on the results of preliminary testing) (3).

Second, the reason why asymptomatic patients underwent invasive coronary angiography requires clarification, because there is no clear benefit of revascularization in these patients; the same also applies to patients with normal stress tests and nonobstructive CAD on CCTA.

Third, the role of CCTA in asymptomatic patients is still not established. With regard to the recommendations of the authors to use CCTA in the asymptomatic individual with cardiac risk factors instead of a stress test before surgery or beginning of a vigorous exercise program, citing low positive predictive value (PPV) of stress, it is important to note that most patients in the study the authors quote here were symptomatic and that the study also counted equivocal tests as positive while calculating PPV that lowers the reported PPV (4).

Lastly, it would also be interesting to know whether the authors made any attempt to study the impact of calcium score on the role of CCTA as "gatekeeper" to invasive coronary angiography.

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Reply

Dr. Sharma conveys reasonable concerns with regard to our findings from the ACIC (Advanced Cardiovascular Imaging

Table 1 Correlation Between Abnormal Stress Tests, CCTA, and ICA

		Stenosis on ICA											
		ICA		Sensitivity (%)		Specificity (%)		PPV (%)		NPV (%)		FP (%)		FN (%)	
	N	>50%	>70%	>50%	>70%	>50%	>70%	>50%	>70%	>50%	>70%	>50%	>70%	>50%	>70%
Abnormal MPI	294	174	146	64.7	65.8	29.4	31.8	59.2	49.7	34.5	47.6	40.8	50.3	65.5	52.4
Abnormal SE	54	31	25	40.8	43.1	48.9	54.0	57.4	46.3	32.8	50.8	42.6	53.7	67.2	49.3
Abnormal TMET	40	25	20	69.4	64.5	40.0	33.3	62.5	50.0	47.6	47.6	37.5	50.0	52.4	52.4
Abnormal stress test (any)	388	230	191	60.4	61.4	34.2	36.5	59.3	49.2	35.2	48.5	40.7	50.8	64.8	51.5
CCTA >50% stenosis	506	357	225	93.7	72.4	37.9	71.0	70.6	71.4	79.1	71.9	29.4	28.6	20.9	28.1

CCTA = coronary computed tomography angiography; FN = false negative; FP = false positive; ICA = invasive coronary angiography; MPI = myocardial perfusion imaging; NPV = negative predictive value; PPV = positive predictive value; SE = stress echocardiography; TMET = treadmill exercise testing.

Consortium) registry (1). We agree that using a cutoff of >50% stenosis rather than >70% stenosis is a limitation of this study, as clarified in the paper. Stress tests in this study were varied and consisted of 3 different modalities that have varied strengths and limitations. For example, although stress echocardiography performs best to detect ischemia in territories with hemodynamically significant (>70%) stenosis, numerous studies have also assessed the accuracy of this modality for using an angiographic stenosis cutoff of ≥50% as significant (2). Due to its ability to detect flow heterogeneity because of impairment of flow reserve (rather than ischemia), nuclear imaging can "pick up" <70% stenosis (3). Hence, a cutoff of >50% in this "mixed bag" of stress tests might not be unreasonable.

With respect to accuracy, our findings reflect the limitations of comparing anatomic versus functional imaging, which have previously been demonstrated as well (4,5). Reassessment of accuracy with >50% and >70% stenosis is presented in Table 1. Although there are minor differences in accuracy between the two degrees of stenoses, it continues to be lower than previously reported.

We also agree that asymptomatic patients have not been shown to benefit from invasive coronary angiography (ICA) or revascularization. As stated in the paper, these results represent "real world" practice. All management decisions in ACIC remain at the discretion of physicians referring these patients to CCTA. Some patients might have had a stress test for screening purposes that were abnormal or questionable, leading to a CCTA for adjudication. The appropriateness of upstream stress testing or downstream ICA or revascularization in asymptomatic individuals remains questionable, and this was beyond the scope of this study. We agree that the role of CCTA in asymptomatic patients is still not established, and as discussed in the paper, CCTA is an effective tool to adjudicate stress test findings, not an alternative to stress tests or no testing in such individuals.

Last, the role of calcium scores as a "gatekeeping" function to ICA was not assessed in this study.

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